1970
SEPTEMBER
VOL. 24
9

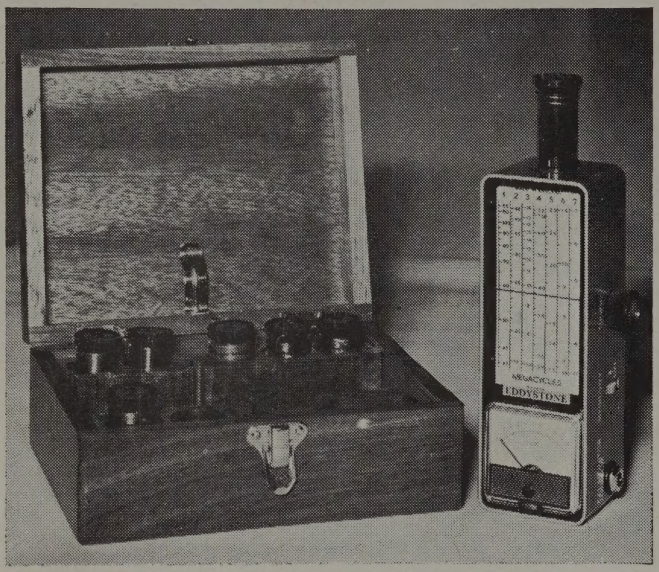
RADIO ZS

OFFICIAL ORGAN OF
THE S.A. RADIO LEAGUE

AMPTELIKE TYDSKRIF
VAN DIE S.A. RADIO LIGA

Registered at the G.P.O. as a Newspaper

Eddystone



"Edometer" Mk II

- ☐ A versatile replacement for the obsolete g.d.o.
- ☐ Solid-state design – silicon transistors
- ☐ Frequency coverage: 370 kc/s – 115 Mc/s
- ☐ Harmonic output to 300 Mc/s as r.f. signal source
- ☐ Battery powered for ultimate portability

Marconi

MARCONI SOUTH AFRICA LTD.

CORNER VAN DYK AND FALKIRK ROADS
INDUSTRIAL SITES, BENONI
Private Bag 1038 Phone 52-5961
Member of G.E.C. — Marconi Electronics Limited

SUID-AFRIKAANSE RADIOLIGA—SOUTH AFRICAN RADIO LEAGUE

HOOFKANTOOR
Posbus 3911, Kaapstad
C.T.M. Gebou, Loopstraat 112
Telegramme: SARLEAGUE

QSL-BURO: Posbus 3037, Kaapstad

ADVERTENSIES:
Posbus 137, Kaapstad

HEADQUARTERS
P.O. Box 3911, Cape Town
C.T.M. Buildings, 112 Loop Street
Telegrams: SARLEAGUE

QSL Bureau: P.O. Box 3037, Cape Town

ADVERTISEMENTS:
P.O. Box 137, Cape Town

RAADSLEDE

President: **H.M. Wilson, ZS1BF**

Vise-President: Colin Duff, ZS1CA
Eresekretaresse: Mev. A.v.d. Merwe, ZS1AZ
Eretesourier: J. Timoney, ZS1TK
QSL-bestuurder: J.E.J. v.d. Merwe, ZS1AW
Takaangeleenthede: Colin Duff, ZS1CA
Radio ZS - H.K. Notas: H. Forrer, ZS1FT
Toekennings-bestuurder: J.G. Gerryts, ZS1VA
Roepseinboek Redakteur: Eric Rhodes ZS1R
P.M.G. - Skakelbeampte: Doug Pitchford, ZS6YB
Tel. Pretoria: 805-2640 (na ure)

Ereregsadviseurs: N.J.J. van Resnburg, ZS1PI

Wedstrydkomitee: DURBAN Tak, Posbus 205, Pinetown.

MEMBERS OF COUNCIL

President: **H.M. Wilson, ZS1BF**

Vice-President: Colin Duff, ZS1CA
Hon. Secretary: Mrs. A.v.d. Merwe, ZS1AZ
Hon. Treasurer: J. Timoney, ZS1TK
QSL-Manager: J.E.J. v.d. Merwe, ZS1AW
Branch Affairs: Colin Duff, ZS1CA
Radio ZS - H.Q. Notes: H. Forrer, ZS1FT
Awards Manager: J.G. Gerryts, ZS1VA
Callbook Editor: Eric Rhodes ZS1R
P.M.G. Liaison Officer: Doug Pitchford, ZS6YB
Tel. Pretoria: 805-2640 (after hours)

Hon. Legal Adviser: N.J.J. Van Rensburg, ZS1PI

Contest Committee: DURBAN Branch, P.O. Box 205, Pinetown.

JAARGELD

Gewone Lid	R4.75
Junior Lid	R2.25
Eggenote van Lid	R2.25
Geasossieerde Lid	R2.75
Inskrywingsgeld (sluit Liga lapel wapen in)	R0.75

SUBSCRIPTIONS

Ordinary Members	R4.75
Junior Member	R2.25
Spouse of Member	R2.25
Associate Member (27/6d.)	R2.75
Entrance Fee (includes League Badge	R0.75

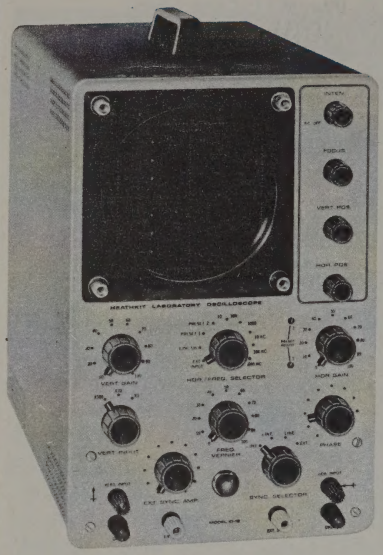
ADVERTENSIE TARIEWE

Gewone Posisies Plasings	1-5	6-11	12
	prys per plasing		
Vol Bladsy	R27	R25	R23
Half Baldsy	R15	R13	R12
Kwart Bladsy	R 8	R7.50	R 7
Omslag		R35	R30

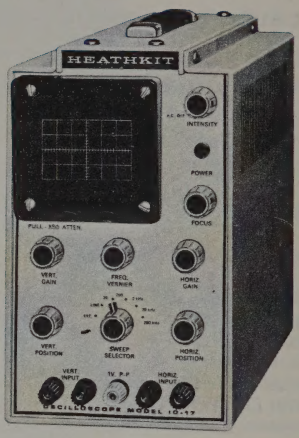
ADVERTISING RATES

Ordinary Positions Insertions	1-5	6-11	12
	price per insertion		
Full Page	R27	R25	R23
Half Page	R15	R13	R12
Quarter Page	R 8	R7.50	R 7
Covers		R35	R30

"Performance-Plus"
Heathkit® Test Equipment
Oscilloscopes



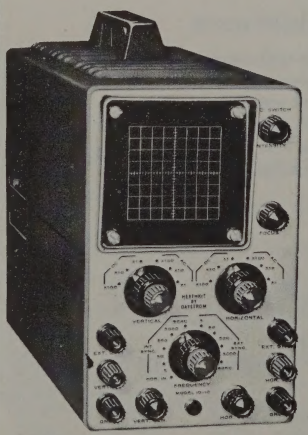
Kit IO-18 R120.00



IO-17 R92.00

We shall be pleased to send you a 114 page HEATHKIT 1970 catalog with specifications and pictures of PERFORMANCE–PLUS HEATHKIT equipment.

Authorized distributor :



Kit IO-10 R110.00

HOLLANDS RADIO

143, Greenway,
Greenside.
Johannesburg.
Tel. 41-8557.

No parking problems.

R71.00 IO-21

RADIO ZS

EDITOR: M. Alexander, ZS1-001
REDAKTEUR:
EDITORIAL COMMITTEE: Ray Alexander, ZS1IM
REDAKSIE: Colin Duff, ZS1CA
DRAUGHTSMAN: N. B. de Jongh, ZS1MM
TEKENAAR:

CONTENTS/INHOUD

GENERAL/ALGEMEEN: Page

Postmaster General's Amateur Radio Operator's Examination	13
Silent Key	15
Letters to the Editor	17
Head Quarter's Notes	18
Branch News	20
Hamads	23
Professor Nutzenhamm and the Speed Key by ZS6-231	24
My Neighbour 10 000 Miles Away by Walt W901	28

TECHNICAL/TEGNIES:

F.E.T. Front-end and Premixer with Electronic Bandswitching	5
Some Linear Considerations Part III by Henry Randall, ZS5HF	11
The H.F. Discone by Henry Randall, ZS5HF	21
Volt-Ohm-Meter Transistor Toetser	27
The G3NUG Tri-Band Single Feed Quad by P. J. van Niekerk, ZS4IO	28

OPERATING/BEDIENING:

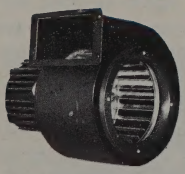
Frequency Prediction Charts	4
CHC Hunt the Hunters (HTH) Awards Programme	9

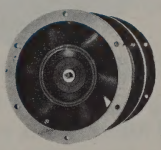
COVER/VOORBLAD: Pieter Jacobs ZS4UH at the controls of his station which is completely homebuilt.

ETRI

Microvent Fans & Blowers

AC
&
DC





Compact & Efficient
Designed for cooling Radio, Electrical & Electronic Equipment.

DC : 6–150v 60-600 cycles
AC : 220–380v Single or Three Phase
Special purpose Fans on application.

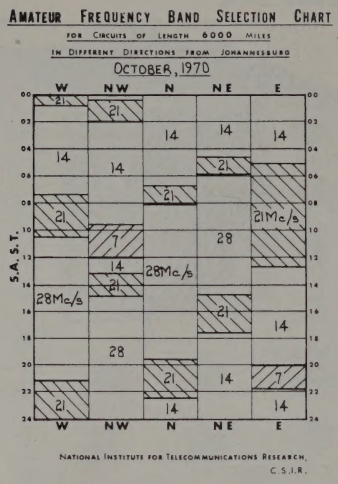
Contact
Eddie Wesselo
ZS6BFP

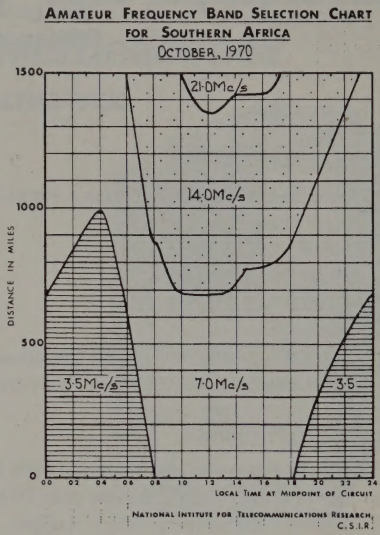
Africa Union
(Pty.) Ltd.

P.O. Box 1493,
Johannesburg.

Tel.: 22-0934

FREQUENCY PREDICTION CHARTS

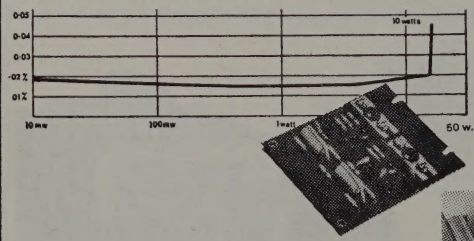




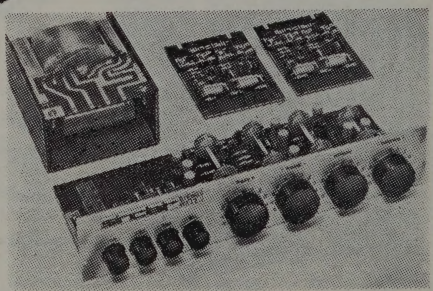
SINCLAIR EQUIPMENT

APPLICATIONS

High fidelity amplifier: car radio amplifier: record player fed direct from pick-up: intercom: electronic music and instruments: P.A., laboratory work, etc. Full details of these and many other applications are given in the manual supplied with your Z.30.



Z12 Amplifier	R12
Z30 Amplifier	R18
Stereo 25 Control Units	R30
Stereo 60 Control Units	R36
PZ4 Powerpack	R15
PZ5 Powerpack	R18
PZ6 Powerpack	R22



POSTAGE PAID C.O.D. OR C.W.O.

TRADE ENQUIRIES WELCOME

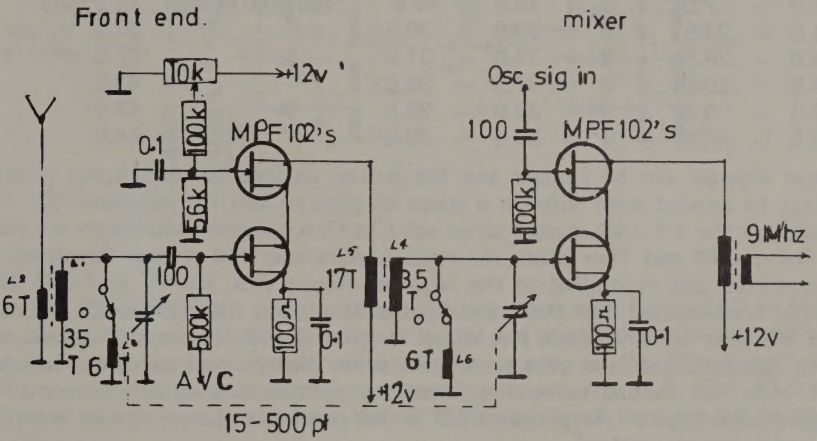
RADFO DISCOUNTS, P.O. BOX 564, MUTUAL BLDG, HARROWER ROAD, PORT ELIZABETH

F.E.T. FRONT-END AND PREMIXER WITH ELECTRONIC BANDSWITCHING.

Translated by N.B. de Jong. ZS1MM.

K. Spaargaren, PAoKSB.
ELECTRON January 70.

When building receivers the biggest trouble is finding a suitable bandswitch. PAoKSB makes this problem easier by switching the various circuits electronically. Starting from the frontend, which is more or less conventional, the HF amplifier consists of two FETs coupled in cascode, the reason for doing this is that a FET transistor exhibits an appreciable reverse capacity and must be neutralised when used as a HF amplifier, to overcome this effect a second FET is used in an earthed gate configuration cascode coupled and the total reverse effect from L4 to L1 through the transistors is so small that no regeneration will occur.



Coils wound on 7mm formers.

The second stage, the mixer, has a similar pair of transistors; in this case only one transistor could have been used but this method provides a good isolation between the oscillator and the HF circuits.

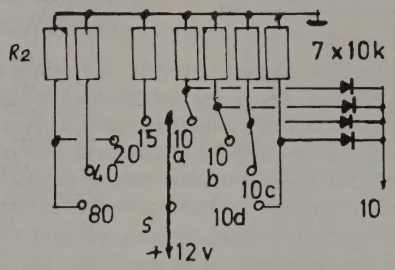
The oscillator input voltage to the mixer must be from 0.3 to 0.6 eff.

AVC or manual gain control can be applied to both the gates of the RF amplifier pair. L1 and L4 always remain in circuit and is tuned to 80m and 40m with the dual tuning condensor, with the switch in the position as shown L3 and L6 shunts L1 and L4 reducing the inductance so that the 20, 15 and 10m can be tuned.

The antenna coupling is through L2 and is used for all the bands and is wound below L2 on the same former; the matching is not maximum but works very well. The centre frequency in this case is 9 Mhz.

The required injection signal could be obtained from a simple switched VFO,

but electronic bandswitching is used in conjunction with a premix VFO, the VFO proper tunes from 5 to 5.5 Mhz so that with the 80 and 20m bands there are no problems. For the 40, 15 and 10m bands the injection frequency must be:—



(7.0	–	7.5)	+ 9	=	16.0	–	16.5	required crystal 21.5 Mhz
(21.0	–	21.5)	+ 9	=	30.0	–	30.5	" " 35.5
(28.0	–	28.5)	+ 9	=	37.0	–	37.5	" " 42.5
(28.5	–	29.0)	+ 9	=	37.5	–	38.0	" " 43.0
(29.0	–	29.5)	+ 9	=	38.0	–	38.5	" " 43.5
(29.5	–	30.0)	+ 9	=	38.5	–	39.0	" " 44.0

These crystals can be bought but the author decided to use surplus crystals which he ground with Vim on a piece of glass to suit his requirements. The results of the FT 243 crystal series used as fifth overtone oscillators are poor so for the 10 and 15m bands the crystals were operated at their fundumental frequencies and multiplied to the required frequencies; for 15 an 8.875 Mhz crystal is multiplied four times and for the 10m band the crystals 8.5, 8.6, 8.7, and 8.8 Mhz are multiplied five times. On 40m 7.166 Mhz crystal is used as a third overtone oscillator; there are quite a few whistles and spurious responses but it is not so bad comparing it with a similar commercial receiver. The biggest advantage of the premix VFO is that just one eightway one bank switch is used for bandswitching.

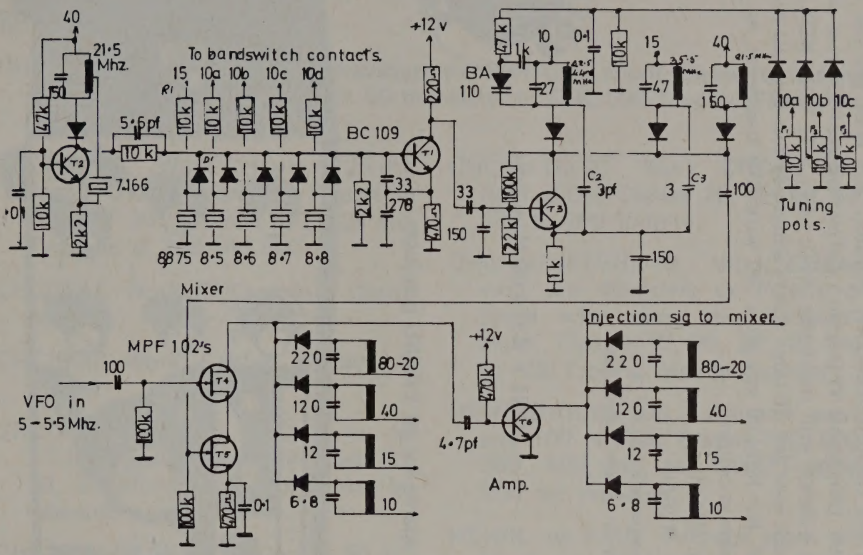
The bandswitching is accomplished the following way :—
The crystal oscillator, T1, will only oscillate with the crystal that is connected through R and the bandswitch, S, to the positive supply.

For Example: If R1 is switched in the current will flow through R1, D1 and R2 to place a 2 volt positive voltage on the base of T1, the required bias voltage, diode D1 has then a very low forward resistance and allows X1 to be coupled to the base of T1, all the other diodes are reverse biased with 2 volts so that all the other crystals are effectively switched out and T1 can only oscillate with X1.

T2 is a conventional third overtone oscillator and will only operate when the bandswitch is in the 40m position T1 then operates as an amplifier.

The same electronic bandswitching is used for the multiplier T3, the collector current can only flow through T3 when the circuit is completed through the bandswitch to the positive supply, the collector voltage is 11.5v; the other diodes are reverse biased with 11.5v and isolate the circuits that are not switched in.

C.O. and premixer. All diodes 1N914 or OA 85 all unmarked transitors BF 194.



With the 43 and 35 Mhz circuits coupling is arranged with C2 and C3 to make these circuits more selective so that only the required harmonic is amplified. Because the circuits are sharply tuned before coming to the 10m circuit, the 43 Mhz circuit must be tuned with a capacitive diode, the 42.5, 43.0, 43.5 and 44.0 circuits are tuned with pots P1 to P3; once tuned they are left in these positions.

The same switching is used in the premixer proper, T4-T5, and the amplifier. The output circuits of the premixer and the amplifier can only be activated when they are coupled through the bandswitch to the positive supply; the other diodes in this case isolate the other circuits from the active ones.

The output from the amplifier in the premixer couples direct to the gate of the mixer in the frontend section.

When a circuit is switched in the reverse capacity, a few Pfs each, of the out-of-circuit diodes are connected in shunt across the tuned circuits and this must be taken into account when these circuits are tuned, especially the 10 and 15m circuits. The 12 volt supply voltage must be reasonably stable so that the reverse capacity of the diodes can remain constant.

The circuits of the VFO and the associated buffers are not shown because it is not essential to the switching circuit. The bandswitching could probably be improved as this article was only written to present an idea. The mixer circuits could be improved by using balanced mixers.

THE LATEST

YAESU

TRANSCEIVER

FT-200

This is the best and cheapest transceiver available, at a price you can afford. S.S.B. – C.W. – A.M. – Ultra stable VFO, geared dial mechanism, 1 Khz read out. Can also be used on 6 meters with transverter. ALC, AGC, RIT, VOX, MOX, ANL, x-tal calibrator, side tone gen. 16 tubes and 18 semiconductors. Separate detectors for SSB and AM. For R324.00 you get a 240 watts SSB transceiver. AC power supply and a speaker in cabinet.

DC power supply R75.00

De luxe mike R26.00

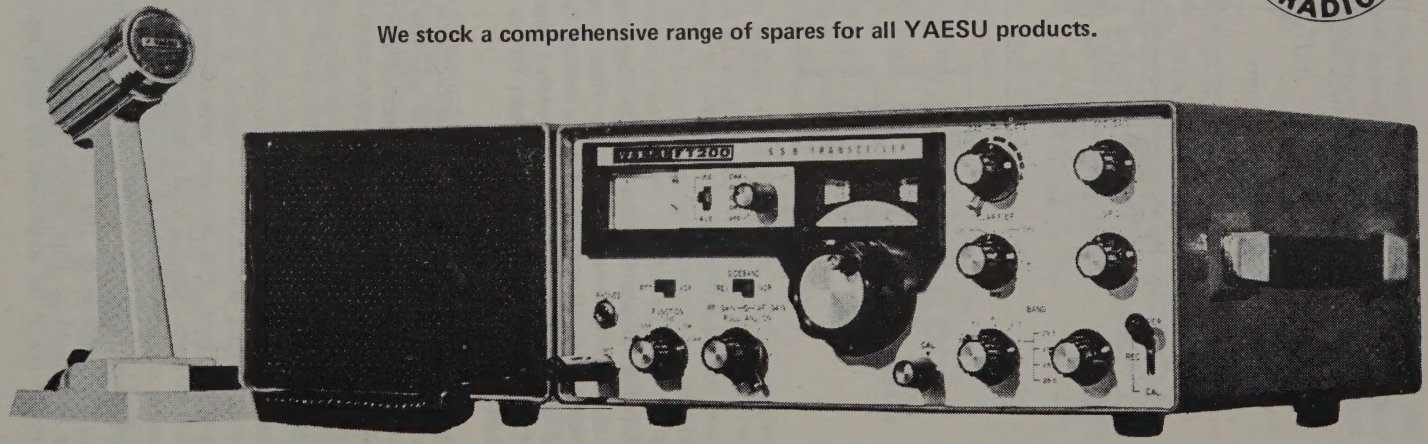
weight 18 lbs. Dimensions 13½ x 5½ x 11"

Selectable Upper or Lower Sidebands.

ONLY R324.00 Ham nett.

HOLLANDS RADIO

We stock a comprehensive range of spares for all YAESU products.



CHC HUNT THE HUNTERS (HTH) AWARDS Program

BASIC

CHC-25 Work any 25 CHCers. Associate and SWL-CHC count. Classes to in steps of 25, 50, 100, 150 and each 50 thereafter to CHC-500 Trophy. Thereafter, trophy at each 500.

CHC/DX-25 Work CHCers in 25 different DXCC countries. Classes in steps of 25, 50, 75, 100, 125 etc. Trophies at 250 and 500.

CHC/WAC Work CHCers in 6 Continents.

CHC/WAS Work CHCers in 50 US States.

CHC/WAZ-10 Work CHCers in 10 I.T.U. Zones. Classes in steps 10, 20, 30, etc. to 75 Trophy. May be repeated.

CHC/WPX-50 Work CHCers in 50 different call prefixes. Classes in steps of 50, 100, 150, etc. to 350 trophy. May be repeated.

CHC/US-CHA-25 Work CHCers who hold Chc's US-CHA in steps of 25, 50, 75, 100, 125 to 500 Trophy. May be repeated.

CHC/FHC-15 Work CHCers who are also FHCers. Classes 25, 50, 75, 100, 125 to 500 Trophy. May be repeated.

CHC/QCWA-25 Work CHCers who are also QCWA. Classes 25, 50, 75, 100, 125 to 500 Trophy. Contacts with OOTCers who are both CHC and QCWA count double.

CHC/OOTC-15 Work CHCers who are also members OOTC. Classes 15, 30, 60, 90 to 200 Trophy. May be repeated.

CHC/SSBers-25 Work CHCers who are also members Int. SSBers. Classes in steps 25, 50, 75, 100, 125 to 500 Trophy.

CHC/AI-Op-20 Work CHCers who hold al-Op. Classes 20, 40, 60, 80, 100 to 200 Trophy.

CHC/MINISTERS-10 Work CHCers who are Ministers or Priests or those who wear any Religion's cloth. Classes 10, 20, 30, 40, etc. to 100 Trophy. May be repeated.

HTH/NOVICES-100 Anyone work any 100 novices. Classes 100, 200 300, 400, etc. to 1,000 Trophy. May be repeated.

HTH/B. or P.-10 Anyone work any blind or paralyzed ham. Classes 10, 20, 30, 40, to 100 Trophy.

WORK CHC, FHC, SWL-CHC, YL, B/P, AMBASSADORS
A = 200: B = 150: C = 100: D = 75: E = 50: F = 35: G = 25: H = 15: I = 10 for basic award.

WORK CHC FHC SERVICE NET CONTROLS
MNC's (Master Net Controls) = 2 points. NC's = 1 Point. Contact with same MNC or NC on different band or mode, in different month or year counts as new contact. No QSL's — only log data required. Figures given here apply to stations outside US territory. AA=500 : A=400 : B=300 : C=200 : D=150 : E=75 : F=35. May be repeated.

CHC/IARJS Work CHCers, FHCers, and/or SWL-CHCers who are also members IARJS. Figures are for stations outside US territory. AA=100 A=75 : B=60 : C=50 : D=40 : E=30 : F=15 : G=10. May be repeated.

Wherever "May be repeated" indicated means that awards can be earned more than once but with different contacts each time.

This awards program is available to ALL hams and SWL's. Revenues from this awards program go to help pay the heavy costs of administering the tremendous CHC, FHC, SWL-CHC big show programs. Each award may be obtained in separate classes or, in all cases MER (Multiple Endorsements Rule) and TCR (Top Class Rule) apply at time of issuance. AOMB/M. No date limits. KH6 and KL7 count both for US state and DXCC country. All awards free to B/P.

Under MER/TCR, any or all above may be endorsed on any CHC/HTH series award when processed and with single fee. Separate awards are available if desired to contribute to CHC big program show "pot". Your economic choice. Program uses 5 different certificate colours in the series. Likewise, when one applies for any one award with $1.00 fee and desires separate class certs rather than MER/TCR endorsements, the additional certs may be had for fee of $0.50 each. REMEMBER – CHC FHC HTH QSO PARTY LOGS NEGATE NEED FOR QSL'S/GCR FOR ALL ABOVE.

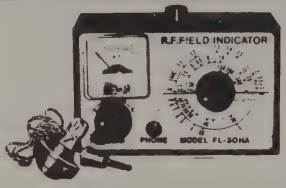
FLASH ! THREE NEW AWARDS ADDED TO PROGRAM ! !

All are CHC/Directory rules & codes. AOMB. B/P. SWL. Repeats. TCR. MER. GCR. $1.00 or 10 IRC.

WORK TOPS/CHCers
WORK FOC/CHCers
WORK HSC/CHCers

In each of above, basic awards is for 15 contacts. Thereafter in steps of each additional 10.

ALL applications to CHC/HQ, 3212 Mesa Verde Road, Bonita, Calif. 92002, USA. For any list of members send SASE to same qth CHC/HQ. RADIO ZS

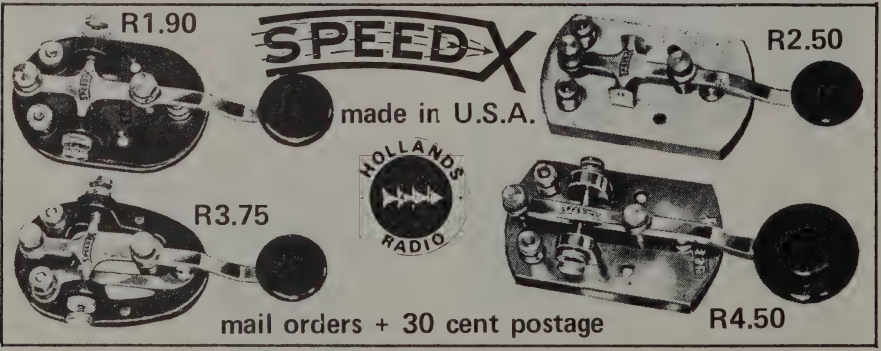


HOLLANDS RADIO

RF FIELD STRENGTH METER 1-400 Mhz. Comes with 5 section antenna and earphone for modulation checking. Invaluable for tuning and transmitter. Magnetic base for mobile use
FL 30 ha. only R8.00

FREQUENCY STANDARD. 100 and 25 Khz.9 volt battery inside cabinet. Includes putput cable. Multi vibrator x-tal controlled.
Model SE 900. only R19.50

143 Greenway,
Greenside, Johannesburg.



SOME LINEAR CONSIDERATIONS by Henry Randall, ZS5HF.

PART III

There is a method whereby power tubes may be operated in the grounded grid configuration without necessity for chokes in the cathode circuit at all. Why one sees so little of this method I don't know because to merit looks like the ideal situation and the fact that the Collins boys use it should be good enough proof of its worth. Possibly reference to fig 2 will help clarify the explanation.

T1 is the normal filament transformer with centre tap ground. C1 is a series feed capacitor with a value of 0.01uf – its basic function being to provide DC blocking for the exciter. C2, which has the same value as C1 is used to shunt the RF across the secondary of T1 and also served to maintain an equal RF voltage on both sides of the filament. There is of course some considerable capacitive coupling between the primary and secondary of T1 and because C2 is not 100% efficient at all frequencies, there will be some little leakage to the primary. RF chokes, RFC1 and 2 together with C3, C4, C5 and C6 ensure that not RF gets into the mains supply. Apart from the capacitive coupling between the primary and secondary, there is also some leakage worthy of note between the windings of T1 and ground and it is for this reason that the drive requirement of this type of circuit are even higher than the more usual cathode choke arrangement, but there again most exciters have got enough power in hand to overcome these additional losses.

Measurement of the RF power of a linear is not as straight forward as the conventional CW transmitter because it SSB it is necessary to measure the instantaneous peak power. Strictly speaking the maximum CW rating produces the same power as the peak rating of the linear, but in practice a linear operated under speech conditions produces more output by virtue of the fact that the average power of a voice modulated signal is much lower than the CW signal when both the average and peak power is the same. It is therefore possible to secure at least twice the output from a tube in SSB service as it is from the same tube used for CW or AM. Many commercial linears run linears as high as 50% above the maximum specified figures for class B and seem to get away with it, though I personally am not very much in favour of this practice.

It will be readily appreciated that it is an easy matter to measure the DC input on a CW transmitter – all that is required is a knowledge of the plate voltage and a suitable milliameter, but this cannot be done on side-band because no meter could possibly follow the modulation waveform. If measurement was attempted it would be found that the plate current was apparently very low.

In order to overcome this problem measurement is effected by modulating the linear with two audio tones for example 1 Kc/s and 2 Kc/s – both tones being of the same amplitude and pattern. The meter used to mea-

sure plate or cathode current will now read an average current. As is well known, all that one has to do to calculate the peak value of an RMS waveform, is to multiply by 1.4. Therefore a linear amplifier with a plate voltage of 1kV and showing a plate current of 350 mA when driven with a two tone test signal, has a Peak Envelope Power (PEP) of slightly less than 500 watts. The signal which reaches the antenna terminal will vary depending upon the efficiency of the tank circuit, but is typically about 65 percent of the peak output.

There are of course other methods of measuring the PEP, but these all require rather sophisticated instruments generally out of reach of the average 'Ham'.

As mentioned earlier, a linear earns its name because of the fact that it does not generate distortion. However, the margin between maximum output and minimum distortion is very slight indeed.

The principal caused of distortion in linear amplifiers are incorrect bias, over-driving over-loading and incorrect dip. Distortion cannot be measured on any simple meter and therefore an oscilloscope or at least a CRT and power supply are essential.

Probably the simplest way of measuring distortion or non-linearity is with a simple CRT — no amplifiers or time-base being necessary.

A sample signal is taken via a diode detector from the input and a similar sample is taken from the output with an *identical* diode detector circuit but with the addition of a non-inductive attenuator which can take the form of ordinary good quality carbon resistors up to 50 Mc/s or so. The two equal amplitude signals are fed to the X and Y plates of the scope and the resultant trace will be at approximately 45 degrees to the horizontal — the actual angle being dependant to some extent upon the actual signal levels applied to the X and Y plates.

If there is no distortion, the trace produced will be a perfectly straight line, but distortion will manifest itself by bending the trace to a varying extent. Depending upon where the 'blend' of the trace occurs an accurate diagnosis of the cause of the non-linearity can be established.

Perhaps one of the most interesting causes of non-linearity is that caused by incorrect 'dip' because it will often be found that minimum distortion occurs not on 'dip' but slightly off dip either to the HF or LF side. This minor point in tuning is probably the cause of 75% of the distortion that one hears on side-band transmissions today and without the simple little 'scope circuit described above it is impossible to tune for minimum distortion.

Just as AM distortion manifests itself as 'splatter' so does SSB except that it is worse because at least with AM it is possible to copy but with SSB its likely to be extremely difficult. It should be remembered that the whole point of single side-band is to use only half the spectrum of conventional AM, but if an SSB station uses more than 3Kc/s of spectrum you may just as well use AM because at least with AM the 'talk-power' is only $\frac{1}{8}$th as great as SSB.

DEPARTMENT OF POSTS AND TELEGRAPHS
POSTMASTER GENERAL'S AMATEUR RADIO OPERATOR'S EXAMINATION

MAY, 1970

TIME: Three hours
NOTE: Answer both questions in Part I.

PART I

1. (a) Define: (i) QRN, QRS, QRT, QRZ, QSB.
(ii) A2, A3, A3A, F1, F4.

(b) What particulars should be entered in an Amateur Station Logbook?

2. Write a brief essay on Amateur Radio covering the most important points in obtaining an amateur licence and operating an amateur station.

PART II

Answer question 3 and five questions from the remaining nine. The mark value of each question is indicated.

3. (a) What are sidebands? (3)
(b) What is the bandwidth of an A.M. signal if the highest modulating frequency is 3000 Hertz (cycles per second)? (3)
(c) What is the bandwidth of a S.S.B. signal if the highest modulating frequency is 3000 Hertz? (3)
(d) If it is found that the A.M. signal occupies much more bandwidth than it should, what are the probable causes? (8)
(e) What effect would non-linearity in one of the stages of a S.S.B. transmitter have on the bandwidth of the transmitted signal? (8)

4. (a) What effect does the length of the antenna have on the reception of radio signals on the ten metre band? (10)
(b) Describe a general purpose antenna for reception in the ten metre band giving typical dimensions? (5)

5. What is the "Q" of an inductor? (5)

If an inductor of 10 microhenries has a Q of 100 at a frequency of 7 mHz what is its loss of resistance? (10)

6. Electrolytic capacitors and chokes are used for the smoothing of the D.C. supply from power supplies. Describe the action of each component in a standard capacitor input "brute force" type of smoothing circuit. (15)

7. What are the advantages of the superheterodyne receiver over the tuned radio frequency receiver in the short wave bands? (9)

What is image interference? (3)

What is double conversion? (3)

8. Describe the principles of Class C amplification as applied to radio frequency power amplifiers. (10)

How does the power gain of a class C amplifier compare with that of a class A amplifier? (5)

9. Draw the block schematic and explain how you would use an oscilloscope for the purpose of modulation checking of an A.M. transmitter. (15)

10. Draw the circuit diagram of a simple C.W. transmitter comprising an oscillator stage followed by a buffer amplifier and power amplifier. (15)

11. Explain briefly what is meant by:
    (a) Ground wave propagation. (5)
    (b) Line-of-sight propagation. (5)
    (c) Sky-wave propagation. (5)

12. Two resistors of 10 ohms and 15 ohms are joined in parallel and are connected to a 6 volt battery.
    Ignoring internal resistance in the battery, calculate:
    (a) the current drawn from the battery (3)
    (b) the current in each resistor (6)
    (c) the power dissipated by each resistor. (6)

The following information regarding the candidates that wrote the examination is made available:

Total entries	40
Number of Candidates	33
Percentage passed	57%
Percentage failed	43%
Highest percentage mark	94.3%
Lowest percentage mark	8.3%

DEPARTEMENT VAN POS-EN-TELEGRAAFWESE
POSMEESTER-GENERAAL SE EKSAMEN VIR AMATEURRADIOBEDIENERS

MEI 1970

TYD: Drie uur
LET WEL: Beantwoord albei vrae in afdeling I.

AFDELING I

1. (a) Definieer: (i) QRN, QRS, QRT, QRZ, QSB.
   (ii) A2, A3, A3A, F1, F4.
   (b) Watter besonderhede moet in die logboek van 'n amateurstasie ingeskryf word?

2. Skryf 'n kort opstel oor amateurradio waarin u die belangrikste punte betreffende die verkryging van 'n amateurlisensie en die bediening van 'n amateurstasie dek.

AFDELING II

Beantwoord vraag 3 en vyf vrae uit die oorblywende nege. Die puntewaarde van elke vraag word aangedui.

QSY Bladsy 16

Silent Key

HAROLD J. TRONSON
ZS1CZ

The news of the untimely passing away of Harold, ZS1CZ, on the 19th August, 1970, at the age of 52, came as a great shock to his many friends in "Ham" fraternity and to the members of our League, particularly in the Cape Town Branch. Many of us remember him from the pre-war days when he was licensed in 1937 and was one of the enthusiasts who frequented the well known rendezvous of the Cape Town "Hams" in the shop of the late Charles Gingold.

Always a staunch supporter of our League, Harold served at various times on the Committee of the Cape Town Branch and on the Council of our League. During his time on Council he was on the sub-committees for Contests and Awards and the Callbook. During his years on the air Harold was a keen DX worker and took part in many DX contests and made many friends among the DX fraternity.

On behalf of Council and our members we extend our sincere sympathy and condolences to his wife Ailie and his three daughters and our hopes that our prayers and thoughts will help to sustain them in their time of sorrow.

ZS1BF

vervolg van bladsy 14

3. (a) Wat is sybande? (3)
   (b) Wat is die bandwydte van 'n AM-sein as die hoogste moduleerfrekwensie 3000 Hertz (siklusse per sekonde) is? (3)
   (c) Wat is die bandwydte van 'n ESB-sein as die hoogste moduleerfrekwensie 3000 Hertz is? (3)
   (d) Wat is die moontlike redes as die AM-sein 'n baie groter bandwydte beslaan as wat hy behoort te beslaan? (8)
   (e) Watter uitwerking sal nie-lineariteit in een van die trappe van 'n ESB-sender op die bandwydte van die oorgesende sein hê? (8)

4. (a) Watter uitwerking het die lengte van die antenne op die ontvangs van radioseine in die tienmeterband? (10)
   (b) Beskryf 'n aldoelantenne vir ontvangs in die tienmeterband en gee tipiese afmetings aan. (5)

5. Wat is die „Q" van 'n induktor? (5)
   As 'n induktor van 10 mikrohenrys teen 'n frekwensie van 7 mHz 'n Q van 100 het, wat is sy verliesweerstand? (10)

6. Elektrolitiese kapasitors en smoorspoele word gebruik om die gs-toevoer van kragbronne af te vlak. Beskryf die werking van elke komponent in 'n standaard dwangtipe afvlakkring met kapasitorinset. (15)

7. Wat is die superheterodine-ontvanger se voordele in die kortgolfbande bó die ingestemde radiofrekwensieontvanger? (9)
   Wat is beeldsteuring? (3)
   Wat is dubbelomsetting? (3)

8. Beskryf die beginsels van klas C-versterking soos dit op radiofrekwensie-kragversterkers toegepas word. (10)
   Hoe vergelyk die kragwins van 'n klas C-versterker met dié van 'n klas A-versterker? (5)

9. Teken die bloktekening van 'n ossilloskoop en verduidelik hoe u dit sou gebruik om die modulasie van 'n AM-sender te kontroleer. (15)

10. Teken die kringdiagram van 'n eenvoudige gg-sender wat bestaan uit 'n ossillatortrap wat deur 'n bufferversterker en 'n kragversterker gevolg word. (15)

11. Verduidelik wat bedoel word met:
   (a) Bodemgolfvoortplanting; (5)
   (b) gesigslynvoortplanting; (5)
   (c) ionosfeergolfvoortplanting. (5)

12. Twee resistors, een van 10 ohm en een van 15 ohm, word parallel verbind en aan 'n 6-voltbattery verbind. Ignoreer die interne weerstand van die battery en bereken:
   (a) die stroom wat uit die battery getrek word; (3)
   (b) die stroom in elke resistor; (6)
   (c) die krag wat deur elke resistor gedissipeer word. (6)

The views expressed in letters to the Editor are the views of the correspondent and do not necessarily reflect the views of Council or the Editor.

47 Glouchester Road, Wolverton, Bucks., England.

Dear Sir,

The Late Ken Scott, ZSIBV

A regular daily schedule of many years standing with G,WI,2,4,5,9, ZE,5N2, and CTI ended on June 25th, 1970, with the passing of Old Timer Ken Scott, ZSIBV, of Cape Town.

His cheery voice with comments on the weather, his dog, his garden and propagation on the H.F. bands will be greatly missed.

He had made daily contacts with G at 0600, 1200 and 1600 GMT, providing band checks for more than five years.

A fine O.T. he had, in his earlier days, obtained many certificates including WBE and DXCC, but was always very proud of working the whole of the American Continent on 40M a.m.

His "G" contacts wish to extend their sympathy to his family and to the South African Amateurs on the loss of one of their Old Timers, regretting the passing of a real friend.

Yours sincerely,
F. H. Dewick, G3HIU.

P.O. Box 193, Halfway House, Tvl.

Dear Sir,

It is abundantly clear that Ben van Tonder ZS6BGL displays, in his letter in your July issue, a lack of knowledge of what really takes place in the League's dealings with the P,M.G.

His lack of appreciation of the significance of keeping politics out of amateur radio is exceeded only by his aggressive approach to public relations and image building.

There is no point in dragging amateur radio into a political arena, radio amateurs will not tolerate the tainting of their hobby.

Analysis of the number of amateurs to be found in the field of electronics will reveal that a small percentage only meets the requirements of modern technology.

The League is looking for an Editor for Radio ZS and it might be opportune for ZS6BGL to take on this onerous task and "put the League back on it's feet". You might find it more rewarding, Ben, than sniping at people who, for many years, have spent more time in service to the League than they have spent on the air.

Doug Pitchford, ZS6YB.

ADVERTISERS PLEASE NOTE

Radio ZS is printed by the Lithographic process.

Copy for adverts should be ART-PULLS or patch-up of illustrations with type matter in position for camera. Please do NOT send Blocks.

Op 'n vergadering gehou te Hofkantoor, op die 21ste Julie 1970, het o.a. die volgende onder bespreking gekom. Daar is gelet dat sommige Tak nuusbriewe talle Tegniese artikels asook advertensies bevat. Daar Radio ZS 'n baie groter opset het as die Tak Nuusbriewe is daar net gewonder of hierdie artikels en advertensies nie in Radio ZS beter benut kon word nie. Uit die aard van die saak word Radio ZS tans onder baie moeilike omstandighede oor die gang gehou, en dit sonder 'n voltydse redakteur. Mag ons aan die hand doen dat die redakteurs van die betrokke Tak nuusbriewe bostaande in gedagte sal hou? Radio ZS verlang almal se ondersteuning en alhoewel dit nog gereeld verskyn kos dit groot opoffering aan die kant van Annie ZSINZ en ook Koos ZSIAV saam met die drukkers. Dis tog so jammer dat al die belofters i.v.m. Radio ZS by die ontlangse A.J.V. geneem is skynbaar skipbreuk gely het.

Dit is gaaf om uit die notules van die Suid-Transvaal Tak te verneem dat hulle artikels aan Radio ZS gaan stuur, hopelik volg die ander takke hierdie goeie voorbeeld. Ons dank aan die Takke wat van tyd tot tyd wel help.

Ons opregte dank aan ook Dr. Christo Viljoen, ZSIHC, vir die puik artikel oor Mikro-elektronika in die Julie uitgawe van Radio ZS.

By hierdie geleentheid namens die lede, baie geluk met die aanstelling as Hoogleeraar in Elektronika aan die Universiteit van Stellenbosch.

Alle sukses Professor Viljoen.

The International Telecommunications Union spent a great deal of time and study on this question and it was only after the delegates of all the member states had reached agreement that the International Civil Aviation Organization alphabet was approved. We ask our members and branches to do their best to bring this alphabet into use, particularly when working DX. The alphabet is as follows:

Alfa — Bravo — Charlie — Delta — Echo — Foxtrot — Golf — Hotel — India — Juliett — Kilo — Lima — Mike — November — Oscar — Papa — Quebec — Romeo — Sierra — Tango — Uniform — Victor — Whiskey — X-Ray — Yankee — Zulu.

Some of these appear rather unusual at first hearing but if we take the trouble to make ourselves familiar with them and use them whenever necessary we will be doing our share in bringing uniformity and better understanding into this mixed up matter of alphabets.

BRANCH COMMITTEE

We are informed by the East Rand Branch that the following were elected as their Branch Committee:

Chairman:	Mike Rowland, ZS6AFG
Vice-Chairman:	Duppie du Plessis, ZS6BDD
Hon-Secretary:	Jack Adendorff, ZS6-007
Hon-Treasurer:	Bernie Ackerman, ZS6ACK
Members:	Gert Roaux, ZS6AYU,
	Dave Muller, —
	Horst Fischer, ZS6BEJ
	Jimmy Bishop, ZS6TQ

We are informed by the Southern Transvaal Branch that the following were elected as their Branch Committee at their Annual General Meeting held on 25th July 1970:

Chairman:	Hennie Potgieter, ZS6PO
Hon-Secretary/ Treasurer:	Hub Paquay, ZS4PO
Members:	Barrie Badenhorst, ZS4RI
	Herman van Dyk, ZS6AUD
	Bobby Steytler, ZS6ATM

The address remains P.O. Box 959, Vanderbyl Park.

At their Annual General Meeting the West Rand Branch elected the following as their Committee for the year ending 30 June 1971:

Chairman:	W. Krynauw, ZS6RQ
Vice-Chairman:	D. Grundlingh, ZS6BEP
Hon-Secretary:	J. Potgieter, ZS6GW
Hon. Treasurer:	L. Charles, ZS6BJX
Members:	C. Muir, ZS6BCT
	B. Meintjies, ZS6AIB
	R. Caldecott, ZS6BHH

On behalf of Council and our members we wish to congratulate them on their election.

NEW MEMBERS

We wish to welcome the following new members to our ranks and hope they will be with us for many years:

ZS6-197/DL7CY, W. F. B. Stehr, Johannesburg Branch.
ZS6-143, G. Ireland, Johannesburg Branch.
ZS6-137, L. Mer, " "
ZS6-136L, L. R. Sourgen " "
ZS6-AQJ, R.P.U. Steynberg " "
ZS6JS, S. Giorgi, " "
ZS6-193, R. I. Bird, " "
ZS6-150, Mrs. J. B. Webb, " "
ZS6-148, R. L. Jaffe " "
ZS6-144, R. S. Wulfsohn, " "
ZS1NK, J. R. Blignaut, Tak Boland.
ZS1DV, P. A. J. Vercuiel, Tak Boland.
ZS1-064, J. L. Human, Tak Boland.
ZS4HC, Dr. R. C. du Plessis, Tak Vrystaat.
ZS5-019, Alex Maingard-Bishop, Durban Branch.
ZS5-018, E. A. Maingard-Bishop, Durban Branch.
ZS5-015, R. Growdon, Durban Branch.
ZS1-205, H. R. Matthaei, Cape Town Branch.
ZS1-209, C. Nilsen, Cape Town Branch.
ZS1XX, G. T. Fainsinger, Cape Town Branch.
ZS1-204, P. J. Aburrow, Cape Town Branch.
..... H. J. A. Olieslager, Ass. member.

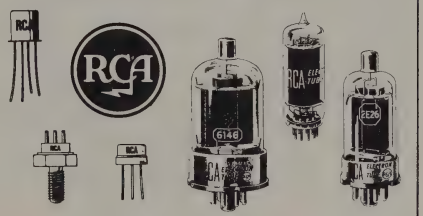
PORT ELIZABETH COMMUNITY CHEST

Port Elizabeth Community Chest will be holding a Carnival during the period September 24/25/26, 1970 at which several P.E. Branch Amateurs will be operating a station allocated the Call-sign ZS2CCC.

All bands 3.5 through 28 MHz will be used and a special QSL card is to be issued to all who contact this station. Return QSL cards should be sent to P.O. Box 776, Port Elizabeth.

Any donations that may be included with QSL's will be received with thanks by the Community Chest.

73,
HERMAN FORRER, ZS1FT.



We are **SPECIALISTS** in tubes and semi-conductors, ready to supply either one replacement tube or major annual requirements covering the full frequency spectrum, for:

✓ AMATEURS
✓ COMMERCIAL BROADCASTERS
✓ INDUSTRIAL USERS
✓ TELEPHONE COMMUNICATIONS

CURRENT CATALOGUE AVAILABLE ON REQUEST

ELECTRONIC RESEARCH LABS.
CAPE (PTY.) LTD.

ERL

411 LIBERTAS
HERTZOG BOULEVARD
FORESHORE, CAPE TOWN
TELEPHONE 2-4869

EAST RAND BRANCH NEWS by Bernie Ackerman, ZS6ACK

Several members of the Branch have increased respect for that imperious gadget, the telephone, since a recent visit to the Telephone Manufacturers of South Africa factory in Springs. The icy weather kept most of the members at home, but those who ventured out agreed that it was a most fascinating experience. OM Les ZS6BDO acted as guide. Due to the vast extent of the operations, it was not possible to see everything and another expedition will, we hope, take place.

The 1970 A.G.M. was held at the QTH of OM Stan ZS6BJB, where all recent meetings have taken place. Several new faces were seen in the crowd. Due to salt mine activities the Treasurer, OM Peter ZS6018 was unable to present a financial statement. However, he assured us that the Branch was in good financial standing.

In the Chairman's report, OM Mike, ZS6AFG, said, inter alia, that the Branch had experienced several trying times during the year, but the enthusiastic efforts of the willing few had made the difference. If all members contributed what they could, the Branch would go from strength to strength.

OM Les ZS6BDO took the chair while the new committee was elected. OM Mike ZS6AFG was the only nomination for Chairman, and was re-elected by popular acclaim. OM Duppie ZS6BDD and OM Horst ZS6BEJ slugged it out for Vice-Chair with OM Duppie winning on points. The previous Secretary, OM Jackie ZS6007, was quickly put back into harness. Somebody was heard to remark that it was time "James Bond" got his license to talk, Hi. OM Peter decided to stand down from the Treasurers post and OM Bernie ZS6ACK was elected.

Editor of the *Erb Carrier* remains OM Gert ZS6AYU and OM Dave Miller was pressganged into being Assistant Editor on the distribution side.

Committee members are OM Horst ZS6BEJ and OM Jimmy ZS6TQ.

After a magnificent tea, a general ragchew was held from which members reluctantly drifted home. Future programmes are of necessity vague, but it is hoped to run a refresher course on the basics of radio concurrently with the more advanced technical lectures — with occasional film shows and ragchews to give us time to absorb all the new information. RADIO ZS

---

vervolg van bladsy 27

$$\text{Wins} = \frac{R4}{2 \times R5} = \frac{150 \times 1000}{2 \times 500} =$$

150 of Ik = wins van 1.

As 'n paar oorfone oor R5 gekoppel word in plaas van die meter dan sal 'n goeie aanduiding van die geraas in die transistor verkry word.

ZS1MM Stroombaan Versameling

Ns. In plaas van 'n opgedeelde wyserplaat kan die weerstand van R4 met die ohm-meter gemeet word, met die krag afgeskakel, en vir elke Ik 'n wins van 1 toe te laat. RADIO ZS

THE H.F. DISCONE

by Henry Randall — ZS5HF.

In these modern times there must be very few of us who have not at least been to a reasonable sized airport at some time or another and being good Hams, we will have kept our eyes open and will have noticed that spidery looking device perched near the control tower — that spidery looking device is not a lightening arrestor but a broad-band antenna.

Most people associated with radio communication will be aware that UHF and VHF bands tend to be quite wide — spreading over many megahertz. For example the normal aircraft VHF band stretches from somewhere about 110 Mhz to about 138 Mhz and the UHF bands stretch in a similar fashion. Naturally conventional antennas with a bandwidth of a few hundred Khz would be of little value and, therefore, attention has been given to the design of a "broad-band" antenna. The result of research has produced a number of interesting configurations, but one of the simplest is the "DISCONE". This antenna features extreme simplicity of construction an exceptionally low radiation angle excellent omni directional progagation and up to 10:1 bandwidth. The possible disadvantage is that the Discone has a unity gain. However, don't let this put you off because some mighty fine contacts have been made with a ground plane.

As the name implies, the Discone comprises a "disc" or "hat" and a cone — the "disc" portion is the "hot" leg and the cone is at ground potential. Being an unbalanced antenna it is ideal for coax feed and if the dimensions below are followed the feed impedance will be an almost perfect match to 52 ohm coax (RG 8/U / UR67 etc). On the assumption that the lower design point is 7 Mhz the upper limit will be close to 70 Mhz so all bands can be covered, 40 thru' 6, with an SWR of less than 1:5:1 to boot.

Another feature of the Discone is that the height of the radiator is not a determining factor in system performance — the height is actually determined by calculation but the notable point is that for a dipole at the same height the radiation angle would be close on 90° — virtually useless.

Possibly the discone on 40 metres is a little large about the skirt but for 20 or 15 it could be a definite proposition more especially as you could cover way above 2 metres with a single antenna.

References to the sketches will show the principal constructional points. Figure 1 shows the discone in "skeleton" form. The dimensions for L.F. cut off frequencies of 20: 15: and 10 are as follows :

20 Metres

D = 12 feet
L = 18 feet
S = 10 feet
R = 18 feet
H = 15 feet 7 inches

15 Metres

D = 8 feet
L = 11 feet
S = 6 inches
R = 12 feet
H = 10 feet 5 inches

10 Metres

D = 6 feet
L = 9 feet 6 inches
S = 4 inches

☛

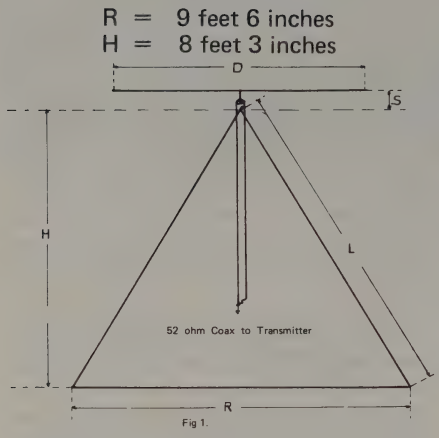


Fig 1.

Feed impedance is determined by distance "S" and should be closely adhered to. If other feed line impedance (say 75 ohm) were to be used spacing "s" could be determined by trial and error.

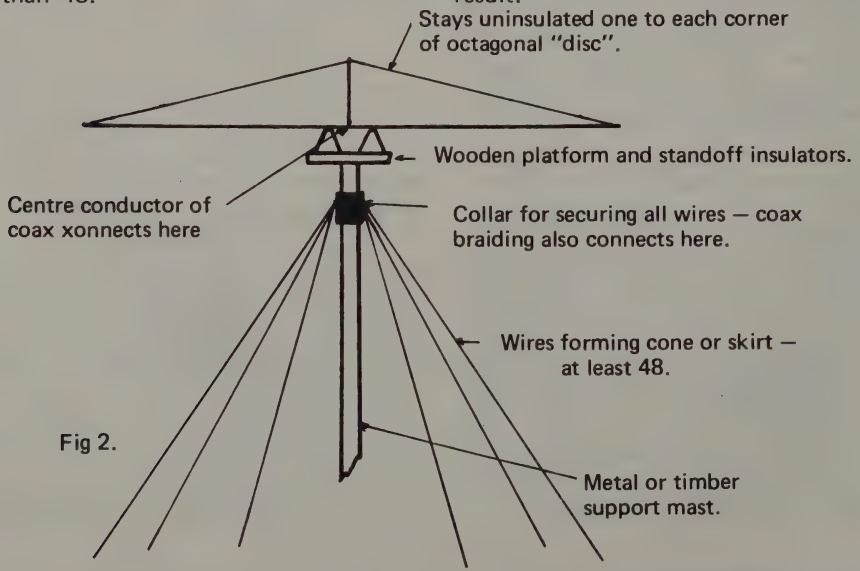
The supporting structure for the "disc" does not have to contain fantastic modulation properties because of the low feed impedance and, therefore, any hardwood suitably water proofed is perfectly adequate. A more important consideration is that the wood be of good quality and will withstand the strains introduced by the disc in a high wind, though it should be noted the wind resistance is very low with the discone.

The mast section, which may be of wood or metal, is fully supported by the multiple wires forming the cone. If a metal support is used the coax could be fed through the pipe and, therefore, automatically preventing any possible feed line radiation — the balance of the coax being buried for convenience.

The more wires that go to form the cone the better as this will help to smooth out any "kinks" in the pass-band but there should not be fewer than 48.

The centre of the disco is formed by an aluminium plate at least $\frac{1}{8}$" thick, the eight radials are fabricated from $\frac{3}{4}$" x $\frac{3}{4}$" x $\frac{1}{8}$" aluminium stock securely bolted to the centre plate.

The tips of the radials are joined by wire (uninsulated) as are the mid points of each radial. Here a word of caution — try and use aluminium wire — do not use copper as aluminium and copper are too far apart in the galvanic scale and severe corrosion will result.


Stays uninsulated one to each corner of octagonal "disc".
Wooden platform and standoff insulators.
Centre conductor of coax xonnects here
Collar for securing all wires — coax braiding also connects here.
Wires forming cone or skirt — at least 48.
Metal or timber support mast.
Fig 2.

A two foot pipe section ± 1" OD is secured either by welding or by a flange to the centre of the centre plate. From the top of this section to the top of each radial a stray wire is run. These stray wires must not be insulated from the rest of the disc and must not be broken up by insulators.

A cone is fabricated from at least 48 wire equally spaced about a common "collar" mounted near the top of the mast. The wide end of the cone may be grounded if necessary and for support purposes a "ring" is fabricated from suitable material and to which the lower end of the cone wire may be soldered.

Being "broadband" there is virtually no "setting up" to be done and all dimensions are relatively non critical excepting that of "S" which determines the feed impedance — deviation from specified dimensions could result in a different LF cut off frequency and the possible introduction of "kinks" in the passband relative to SWR.

73's.

RADIO ZS

ham radio magazine

Limited supplies of back issues available. Send 50 cents, uncrossed postal order and we will send you a trial number.

This is a 95 page HAM MAGAZINE with technical and constructional articles of interest to every HAM.

Subscription rate for Southern Africa :

1 year	R4.50	(12 issues)
3 years	R9.00	(36 issues)

Payment by uncrossed postal order only, to the AGENTS :

HOLLANDS RADIO

143 Greenway, Greenside, Johannesburg.

Hamads

P.O. BOX 137, CAPE TOWN — RATES: R0.50 for 20 words, 2 cents per word thereafter for members. Non-members and commercial smalls: R1.00 for 20 words, 4 cents per word thereafter. PLEASE SEND THE CORRECT AMOUNT WITH EVERY HAMAD OR SMALL.

WANTED: Motor Cycle not later than **1936** model. Please state model, make, etc. ZS6AE, Box 61587, Marshalltown, Transvaal.

WANTED: Collins TCS Battery Powered Transmitter/Receiver 6 or 12 volt. Write stating condition, accessories, circuit diagram and lowest price: C. E. Lowe, ZSIA, P.O. Whitesands, via Heidelberg, C.P.

FOR SALE: V.H.F. Base Station. 50 Watt output; Receiver 1 — 20 MHz with aerial. Phone Nolte, 24629.

FOR SALE: Halicrafters SX 28 Receiver Modified with original speaker and spare set of valves. R40 O.N.O. Contact: ZS6CT, 50-14th Avenue, Boksburg North. Telephone: 52-5885.

FOR SALE: Mobile S.B.E. 34 SSB transceiver 12 volt DC or mains. 15-20-40 and 80 meters. With mike and speaker. Only R450.00.

HOLLANDS RADIO,143 Greenway, Greenside, Johannesburg.
Tel. 41-8557 (after hours 46-1841.)

PROFESSOR NUTZENHAMM AND THE SPEED KEY

by ZS6-231, who prefers to remain anonymous.

It was midwinter, and the band had suddenly shut down like a bookie spotting a blue uniform. After listening to the buzz and crackle of static for half an hour, and failing to find inspiration or diversion therein, I decided to betake myself to the shack of the beloved Professor Nutzenhamm, genius in all subjects and savant of Amateur Radio.

Unaccompanied by the XYL (mainly because she has the unfortunate habit of referring to the Prof. and his wife as "the twisted pair"), I set off through the brisk Highveld air in the direction of the Professor's establishment, to be greeted at the door by the kindly Frau Nutzenhamm. "Kommen sie in und grabben ein seat", she invited, when the air was suddenly ionised to a deep violet hue by an exclamation of *"Donnerwetter, Zeben-und-zwanzig mal! ! "* through the open door leading into the Prof.'s shack. Noticing my bewilderment, the kindly frau reassured me — "Do not haben sie any worries, der Professor bin chust zaying his displeasure mit his latest inventing." Then as an afterthought, she clarified, "He always bin macht das cussworden mit miltiples, is very goot economy, ja? "

Digesting this new philosophy of vocal economy, I wended my way toward the shack door through air that was only gradually losing the violet traces of ionisation. The Prof. was standing with his back turned resolutely to his work-table, and was indicating his displeasure to whatever was upon it by refusing to countenance it." Ach, mein youngisher Freund Schultz, comen sie in," the Prof. called, noticing my hesitant entry, and as usual, addressing me as Schultz, for reasons known only to himself.

"What is the problem, Professor? " I queried as I disengaged myself from a disorientingly vigourous handshake. "You haben ein goot idea from how much ich liken das C. W. senden, not zo? Vell, ich bin taken mein loot und go to das Elektronischer schopf, to go und buy eine half-automatisher key, und vat happens? Das dumkopf behind das counter bin tellen me das half-automatischer keys ben outgesold! *Kaput finished gone! ! !* Nicht ein single Buggus Vibroplexii in das whole schopf! Zo, ich maken mein own, full-automatishcer key — behold . . . *Buggus Nutzenhamii! ! ! "*

With a triumphant shout and a gesture of victory, the Prof. turned aside to allow me a view of what was on the work-bench in front of his rig. To my amazement, there was the biggest tok-tokkie beetle I had ever seen, with two terminals sprouting wire on the rear tips of his wings, and a key grip adhering firmly to the top of his head. Seeing my puzzlement, the Grand Old Man of etherborn inanities and technical insanities deigned to explain.

"You know das tok-tockischer buggen, jawohl? Ich bin had ein goot look at das bugs und find das tok-tockischer buggen ist das only one for using das Morser Code in das sex-life. Venn he ist looken for eine girl-freund, he makes das thumps on der ground mit das stomach und signallen mit das Morser Code. Zo, ich bin taken eine

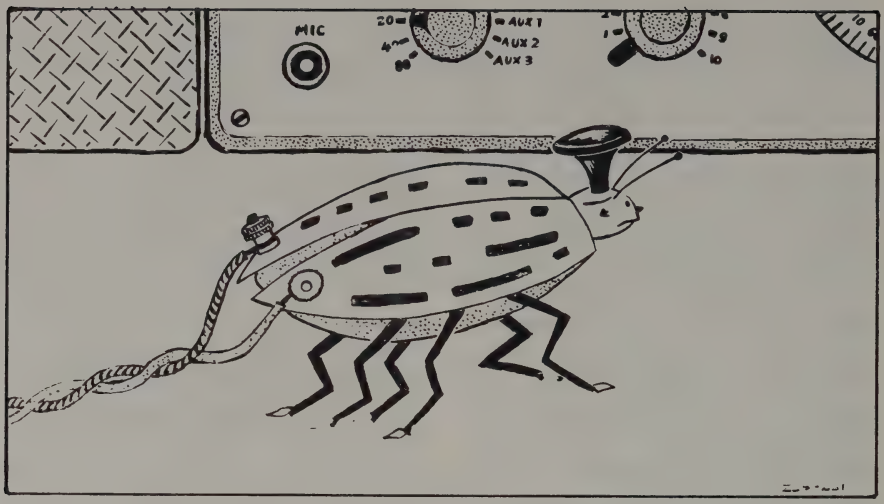
youngisher buggen, und feed him ein gazoonful mit vitamins, so he ist getten very big. *Ein biggen buggen, ja? Heh heh!* Zenn, ich bin taken two contacts, und put ein on each ving, mit attachen das vires. In das key grip on his kopf, I put eine solution of femalisher tok-tockisher hormones, so venn ich bin pressen it down a little vay, das hormonischer water a little leaks oudt, und das bug ist smellen eine girl-freund! Then he ist maken das tocken on das table, und venn his stomach ist hitten das table, his ving-tips ben liften together und eine contack maken mit das terminals! "

Looking very pleased with himself, the Prof. then went on to explain that the lower the key grip on the beetle's head was depressed, the more hormone solution would leak out, and the more dits the "bug" would produce. The more dilute the solution, the lighter and faster the beetle would produce dits, and conversely, the stronger the mixture, the harder and slower the speed at which the "bug" would send. Dahs were formed by simply depressing the beetle's head all the way to the table, whereupon the little fellow got such a potent dose of girl-friend odour right in his nose that he would be powerless to arise for a short time, or to convert it into a string of dits. The dahs were also in proportion to the dits as a stronger hormone solution would keep him floored longer than a weak one.

Tackling the leak in the hormone dispenser on the beetle's head that had been causing him such displeasure upon my arrival, the Prof. allowed me to look over his computerised SWR calculator. This was a device which automatically sampled the forward and reflected power in the transmission line all the time, and automatically found the sum and difference of these two factors, and displayed the comparison on a meter, showing the SWR of 1 on the lower end of the scale, when the reflected power was zero, and the forward + reflected divided by forward – reflected gave a fraction of 1/1, or unity. On the other end of the meter scale, where all the power was reflected back down the line from the antenna, the meter would indicate infinity, for forward plus reflected (now being 2) divided by forward minus reflected (now being zero) would provide a fraction of 2/0, or infinity. While I was still trying to puzzle out what manner of circuitry would provide such results, the Prof. indicated that he was ready to try his new "bug", and promptly fired up his rig on 20, despite my attempts to tell him that the band was as dead as an assassinated doornail.

With a machine-gun rattle, he fired off a string of CQ's and before he could turn the rig on "receive", there was a crackle, a series of minor explosions, and as the rig attempted levitation, the SWR computor wrapped the pointer on its meter around the pointer stop off scale beyond infinity in quiet desperation. *"Himmel, Schultz, giffs Spitzensparken und Smokermaken! ! "* the old man yelled, making a desparate lunge for the master switch.

Having cut off the juice to the rig, he made a wild dash for the door, calling to me, – "Letten us get das heck outside und haven eine look vat is makink mit das infinite SWR! ! " Stopping only in the living room to brace ourselves with a hefty shot of the Prof.'s favourite Kirschwasser, we raced outdoors to observe the antenna. There, clustered about the driven element of the 20 meter Yagi, in a perfectly reflecting layer, was a swarm of thousands upon thousands of female-type tok-tokkies...



The Professor's Speed Key, "BUGGEN NUTZENHAMMII"

RADIO ZS

STOP PRESS

JUST ARRIVED!

YAESU	FT200	R250.00
YAESU	FP200	R60.00
YAESU	DC200	R70.00
YAESU	FTDX400	R380.00

C.S. ELECTRONICS (PTY.) LTD.
In association with C. E. SCOTT (PTY.) LTD.
Showroom: 14 Bree Street, Cape Town
Telephone 2-1301 Telegrams: "ENERGY"

VOLT-OHM-METER TRANSISTOR TOETSER

Aangesien transistors besig is om vinnig toe te neem is dit handig om transistors te kan toets of dit nog in 'n goeie werkende toestand is, gelukkig kan transistors makliker as buise getoets word deur die amateur.

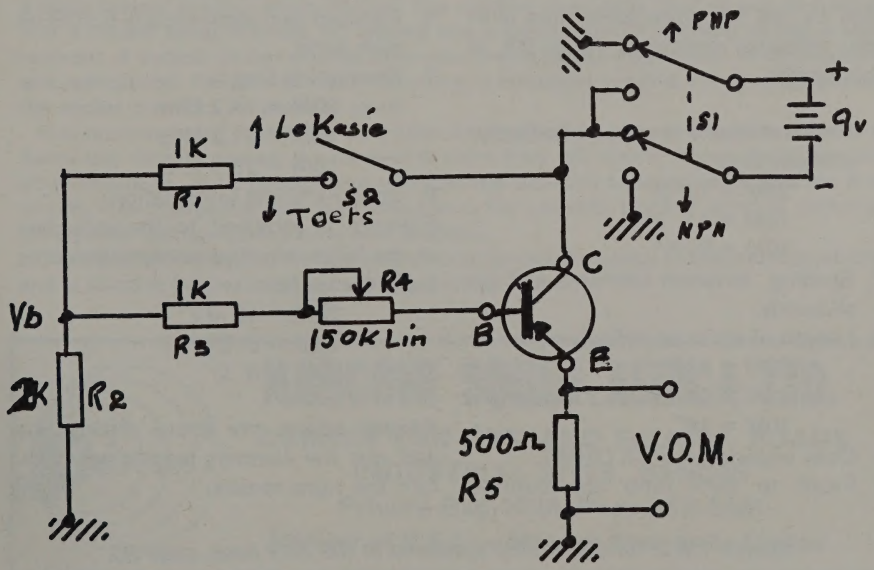
Die skets toon 'n eenvoudige skema vir 'n transistor toetser waar die gewone volt-ohm-meter se 9 volt skaal gebruik word, die voltmeter se positiewe kant moet aan die aardpunt vir PNP transistors gekoppel word en die negatiewe kant aan die aardpunt vir NPN transistors.

Die verstelbare weerstand R4 moet op 'n wyserplaat in 5k dele opgedeel word.

Die verskillende toetse word as volg uitgevoer:-

1. Lekasie- Met S2 oop moet die meter zero of 'n baie laë lesing wys.
2. "Collector-Emitter" kortsluiting- Met S2 gesluit en R4 op zero gestel sal die meter met so 'n kortsluiting 9v wys.
3. "Collector-Base" kortsluiting sal ook 'n 9v lesing wys.
4. "Base-Emitter" kortsluiting sal 'n 2v lesing wys. (Spanning van die spannings verdeler R3.95, geen transistor aksie nie.)
5. Oop "Collector" leiding sal ook 'n 2v lesing wys.
6. Oop "Base" of "Emitter" leiding sal geen lesing wys nie.
7. Goeie transistor sal 'n lesing van ongeveer 5.5v wys.
8. Transistor wins -Stel R4 totdat die meter 2v wys, lees dan die transistor se wins van die opgedeelde wyserplaat af. Dws elke 5k stel 'n wins van 5 voor, dus 50k is gelyk aan 'n wins van 50.

QSY Bladsy 20



MY NEIGHBOUR 10 000 MILES AWAY by Walt, W90I.

Most of us have neighbours with whom we frequently talk.

This particular neighbour lived almost 10 000 miles from Milwaukee Wis, U.S.A., in your country, namely Cape Town and what an interesting neighbour he turned out to be. During the past four years I always looked forward to the daily contacts via ham radio. These contacts brought greetings, personal information, weather and other items of interest. That neighbour was ZS1BV Ken Scott who pulled the big switch on June 25 at 1300 GMT. Our contacts took place each day at 14:40 – 15:20 and 17:20 GMT with but few exceptions. Usually the 14:40 GMT contact was short and Ken would say, "O.K. Walt, you go and have your breakfast and I will call you again at 15:20 GMT". The whole world knew when I ate breakfast. Such was the closeness of our contacts over the years which reached well over 1 000.

Ken always put in a real signal from 3 Anchor Bay and together with WA4PDY, W1LFE, W3VZW, W9DLZ, W9QUV, W7WFP, 5N2ABG, G3AOW, G3HIU, 9Q5AJ and ZE1CB and many other hams in the world mourn the loss of our friend and fellow ham. He will long be remembered. RADIO ZS

THE G3NUG TRI-BAND SINGLE FEED QUAD.

by P. J. van Niekerk, ZS4I0

The Antenna to be described has been used by me for quite some time with very effective results as far as DX is concerned.

1. Driven element lengths = Reflector element length.
   20M = 17' 5"
   15M = 11' 7"
   10M = 8' 7"
2. Spacing between elements is 8' on all bands.
3. Length of stubs on reflectors:-
   20M = 11"
   15M = 11" with 3" spacing
   10M = 18"
4. Coax impedance = 75 OHMS.
5. Front to back ratio approximate 24 DB's on each band.
6. Forward gain approximate 5.5DB on each band.
7. Resonating freq.:-
   20M = 14.2 Mhz
   15M = 21.2 Mhz
   10M = 28.5 Mhz
8. Constructional information:

Element is attached to the spreaders at the following approximate distances from the center:-

20M = 12' 2½"
15M = 8' 3½"
10M = 6' 1"

Always adjust the above dimensions and not the element lengths to maintain the right tension. RADIO ZS

Sketch 1 & 2 for this article appeared in the July issue, page 20.

NEW from Eddystone

EB35 Mk II

transistorized broadcast receiver

This is a model for the connoisseur who requires both quality and long range, with a wide choice of stations. It is a fully transistorized broadcast receiver, embodying techniques developed in the EC10 Mk II communications model, and possessing a similar high performance. The coverage includes long and medium waves, the shortwave bands 1·5 MHz to 22 MHz and the international VHF/FM band of 88MHz to 108 MHz.

The EB35 Mk II is an excellent receiver in its own right, the volume and quality given by the internal speaker being adequate for normal domestic situations, in a cabin, or for portable use in a car, caravan, or boat. Volume and quality can be enhanced by connecting a large cabinet speaker when desired. The receiver also lends itself to use as a tuner unit, a socket being provided for feeding into a quality type of amplifier or into a tape recorder. A second socket enables the output from a record-player head to be amplified and reproduced. For personal quiet listening, a telephone headset can be plugged into the socket provided on the rear panel.

It is recommended HP2 heavy-duty cells are fitted, when a long life can be expected. Some may wish to operate the receiver at home from AC mains, saving the battery for other situations, and a suitable unit—the Cat. No. 924—can be supplied as an extra. It is directly interchangeable with the battery unit. For use with 12V/24V external batteries the type 945 Voltage Converter is also available.

The EB35 Mk II is built to the high engineering standards normal to Eddystone products and is suitable for use in all parts of the world.

MARCONI SOUTH AFRICA LTD.

CORNER VAN DYK AND FALKIRK ROADS
INDUSTRIAL SITES, BENONI
Private Bag 1038 Phone 52-5961

Member of G.E.C. — Marconi Electronics Limited.

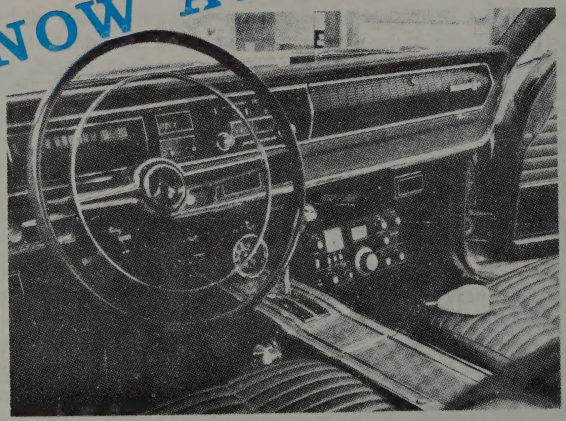
YAESU FT - 100

ALL BANDS TRANSCEIVER

Self-contained 5 band (80 - 40 - 20 - 15 - 10) SSB Transceiver

NOW AVAILABLE

CASH PRICE R365.00



TERMS ARRANGED

HAMRAD (Pty.) Ltd.

INCORPORATING

CHENIK & BARNETT WIRELESS (PTY) LTD.

119 PRESIDENT STREET,

JOHANNESBURG

Phones : 22-4441. 23-4496. 23-4294 P.O. BOX 10982

PUBLISHED BY THE SOUTH AFRICAN RADIO LEAGUE, P. O. BOX 3911, CAPE TOWN
AND PRINTED BY TYPEX PRESS (PTY.) LTD., 201 BREE STREET, CAPE TOWN